

Claims

- [c1] 1. A photo sense element, at least comprising:
 - a diode, wherein the diode comprises a first type doped layer, an intrinsic layer and a second type doped layer, the intrinsic layer is disposed in between the first type doped layer and the second doped layer, the diode has a parasitic capacitor under a reverse bias state;
 - a first electrode, wherein the first electrode is electrically connected to the first type doped layer;
 - a second electrode, wherein the second electrode is corresponded to the second type doped layer; and
 - a dielectric layer, wherein the dielectric layer is disposed in between the second electrode and the second type doped layer, so as to the second electrode, the dielectric layer and the second type doped layer forms a dielectric layer capacitor.
 - [c2] 2. The photo sense element of claim 1, wherein the first type doped layer is N-type doped, the second type doped layer is P-type doped.
 - [c3] 3. The photo sense element of claim 1, wherein the first type doped layer is P-type doped, the second type doped layer is N-type doped.
 - [c4] 4. The photo sense element of claim 1, wherein the material of the dielectric layer comprises SiO_x, SiN_x, ferroelectric and polymer.
 - [c5] 5. The photo sense element of claim 1, wherein the operation mode comprises:
 - before the photons are sensed, providing a first positive bias in between the first electrode and the second electrode to charge the dielectric layer capacitor to a first voltage;
 - wherein when the photo sensing is processing, reducing the first positive bias, so that the second diode processes the photo sensing under the reverse bias state, and partial of the charge of the dielectric layer capacitor is neutralized; and
 - after photons are sensed, providing a second positive bias in between the first electrode and the second electrode to charge the dielectric layer capacitor to the first voltage.

- [c6] 6. The photo sense element of claim 1, wherein the operation mode comprises:
before the photons are sensed, providing a reverse bias in between the first electrode and the second electrode to charge the dielectric layer capacitor and the parasitic capacitor; and
wherein when the photo sensing is processing, maintaining the reverse bias, so as to the diode processes the photo sensing under the no bias state and charges the dielectric layer capacitor continuously.
- [c7] 7. A photo sense element, at least comprising:
a diode, wherein the diode comprises a first type doped layer, an intrinsic layer and a second type doped layer, the intrinsic layer is disposed in between the first type doped layer and the second type doped layer, the diode has a parasitic capacitor under a reverse bias state;
a dielectric layer, wherein the dielectric layer is disposed on the first type doped layer of the diode;
a first conductor layer, wherein the first conductor layer is disposed on the dielectric layer, so as to the first conductor layer electrode, the dielectric layer and the first type doped layer forms a dielectric layer capacitor; and
a second conductor layer, wherein the second conductor layer is disposed on the second type doped layer.
- [c8] 8. The photo sense element of claim 7, wherein the first type doped layer is N-type doped, the second type doped layer is P-type doped.
- [c9] 9. The photo sense element of claim 7, wherein the first type doped layer is P-type doped, the second type doped layer is N-type doped.
- [c10] 10. The photo sense element of claim 7, wherein the material of the dielectric layer comprises SiO_x, SiN_x, ferroelectric and polymer.
- [c11] 11. The photo sense element of claim 7, wherein the operation mode comprises:
before the photons are sensed, providing a first positive bias in between the first conductor layer and the second conductor layer to charge the dielectric layer capacitor to a first voltage;

wherein when the photo sensing is processing, reducing the first positive bias, so as to the second diode processes the photo sensing under the reverse bias state, and partial of the charge of the dielectric layer capacitor is neutralized; and

after the photons are sensed, providing a second positive bias in between the first conductor layer and the second conductor layer to charge the dielectric layer capacitor to the first voltage.

[c12] 12. The photo sense element of claim 7, wherein the operation mode comprises:

before the photons are sensed, providing a reverse bias in between the first conductor layer and the second conductor layer to charge the dielectric layer capacitor and the parasitic capacitor; and wherein when the photo sensing is processing, maintaining the reverse bias, so as to the diode processes the photo sensing under the no bias state and charges the dielectric layer capacitor continuously.